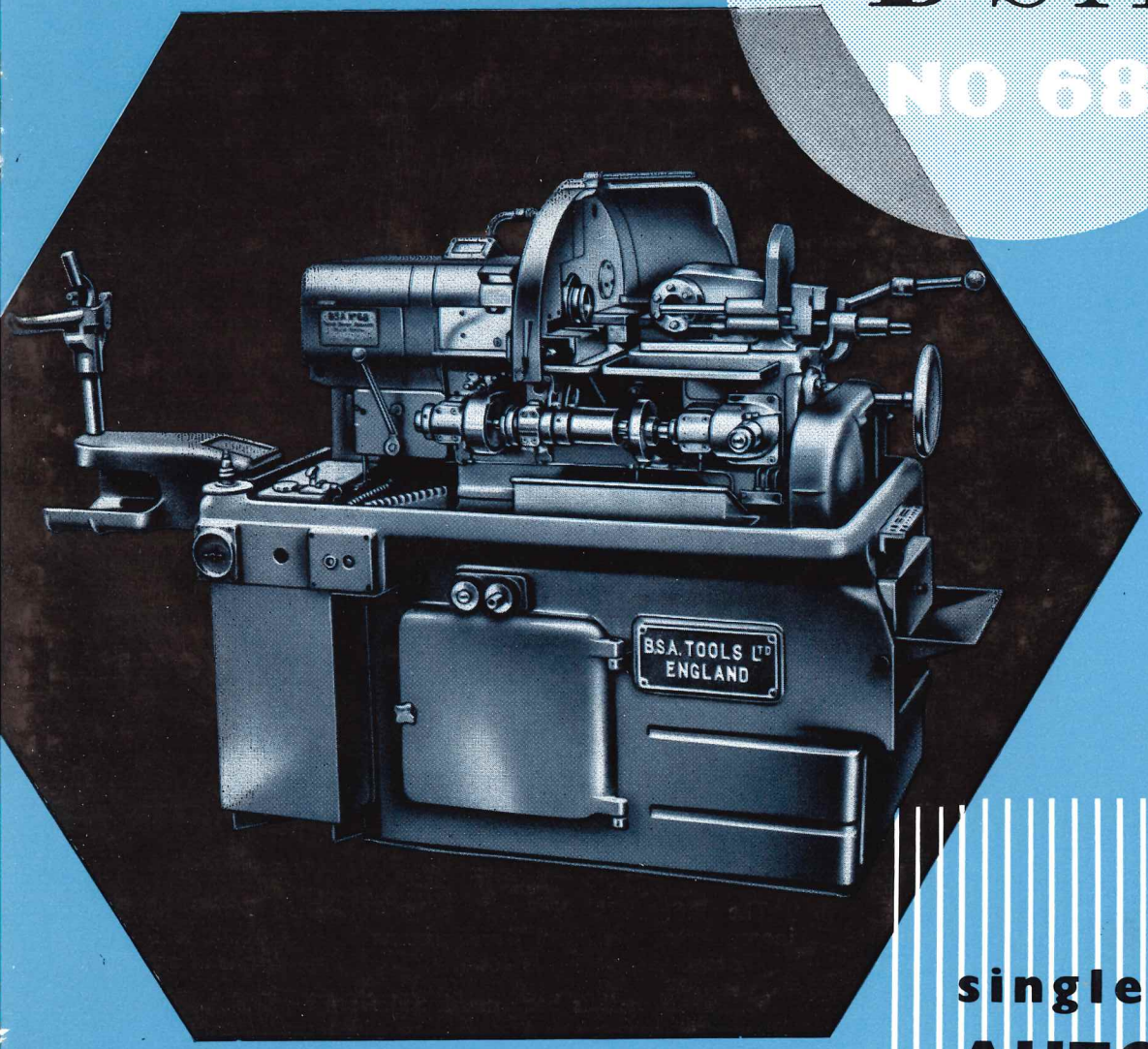
American Machine Tool Co.
Phila. Pa.
May 1, 1958
82-117

B·S·A

NO 68



single spindle AUTOMATIC SCREW MACHINE

DISTRIBUTED AND SERVICED
IN THE U. S. A. BY
THE NATIONAL ACME COMPANY
CLEVELAND, OHIO

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117

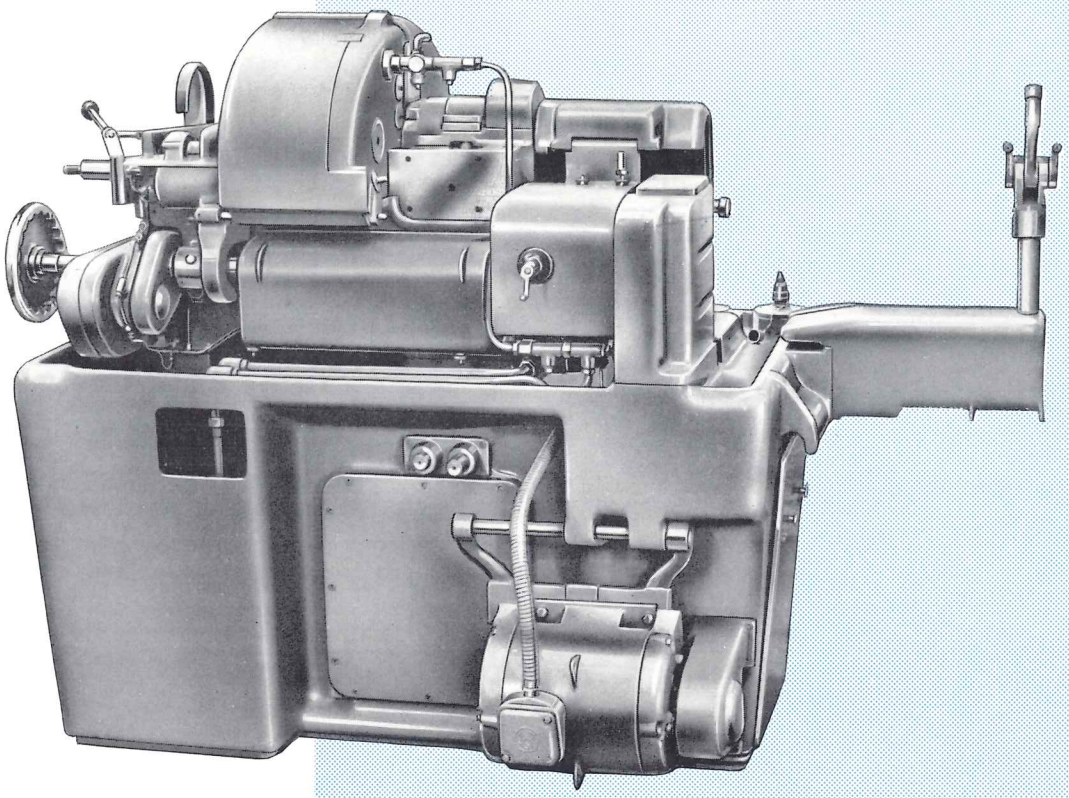


Fig. 2. Rear view of B.S.A No. 68 Automatic Screw Machine showing compact design and effective guarding arrangements.

B·S·A
NO 68

single spindle AUTOMATIC SCREW MACHINE

GENERAL

The B.S.A. 68 Single Spindle Automatic Screw Machine incorporates the latest developments and refinements for the high speed production of components to close limits of accuracy.

This machine has been developed from the B.S.A. $\frac{5}{8}$″ and $\frac{3}{4}$″ Automatic screw machines and provides the fastest means of producing the numerous small components best dealt with by a machine of this type. The maximum spindle capacity for round work is $\frac{3}{4}$″ and spindle speeds range from 53 to 4,480 r.p.m.

Long experience in the design and construction of Automatic Screw Machines has been utilised to provide a trouble-free machine, producing accurate work at higher rates than other machines of similar capacity.

Machines are built in large batches, the materials used and workmanship being of the highest quality.

Ease of operation has been given special attention in the design of this machine. Another important feature is the simple and rapid change-over which can be made from one job to another.

The spindle is mounted in roller bearings, ensuring permanent alignment and enabling high speeds to be continuously maintained.

TURRET

The turret slide moves on large square-section ways, a taper gib being provided for taking up wear. The slide is massively designed to give maximum rigidity to turret tools when taking heavy cuts.

The vertical type turret of heat-treated steel has six stations for standard tools. A full range of tools is available for these machines, and listed on pages 6 and 7.

A valuable feature of B.S.A. Automatic Screw Machines is that the turret can be adjusted forwards or backwards in relation to the slide. This greatly facilitates tool setting, and is a great time saver where parts are being produced in various lengths.

The feed of the turret slide is actuated by cam-operated quadrant and rack.

The turret indexing mechanism operates through a link and Geneva motion, ensuring a smooth and exceedingly rapid movement.

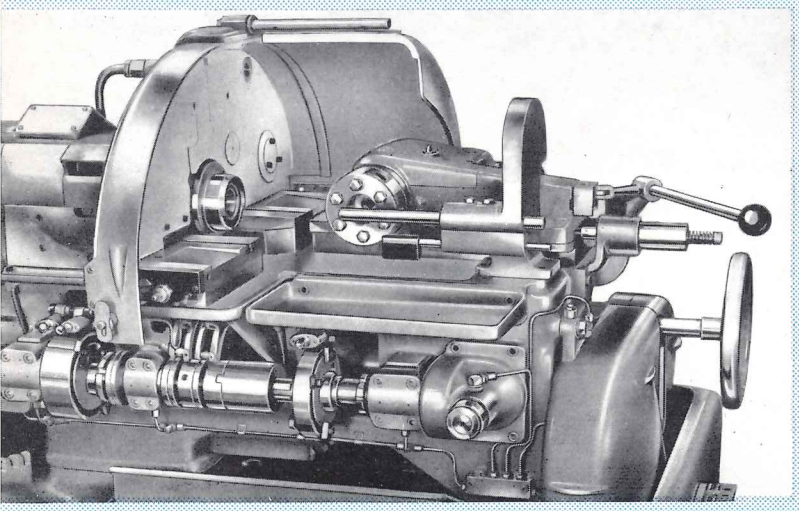


Fig. 3. The camshaft is mounted on the front of the machine and easily accessible. Front of chuck guard removed for photographic purposes.

CROSS SLIDES

These are of hardened steel and slide on ways of ample proportions. They are totally enclosed at the front, thus preventing swarf from entering between the slides, causing sticking and damage.

The cross slides are operated by cams on the camshaft. To facilitate speedy adjustment when setting up, the cams are mounted on serrated sleeves.

The mechanism transmitting motion from the cams to the cross slides has been kept as simple as possible and easily accessible.

Independent adjustment is provided for setting the cross slides forward or backward relative to the centre line of the spindle.

Provision is made for fitting a third or vertical slide when required, the motion for this is taken from an additional cam on the camshaft.

HEADSTOCK

The work spindle is mounted on standard roller bearings. High speeds can be maintained continuously and the arrangement ensures permanent alignment of spindle and turret.

The advantage of this type of bearing is that no wear whatever takes place on the spindle ; if after a very long period of service, adjustment is desirable it is only necessary to renew the bearings.

The spindle is driven through two cone-type clutches by chains from the gearbox. This chain drive is smooth, positive, and allows the spindle bearings to be brought close together, resulting in a short stiff spindle. Adjustable jockey sprockets in the base of the machine maintain correct chain tension.

The clutches are controlled from the camshaft, the appropriate clutch being engaged as required to give a forward or reverse spindle rotation.

The Collets are toggle operated and adjustable for variations in diameter of stock.

Automatic lubrication is provided to the headstock.

FRONT CAMSHAFT

This controls the cross slides, stock feed, spindle speed change and reversal, and the turret indexing. The front camshaft is driven by way of the turret camshaft from the backshaft through a worm drive and pick-off gears which provide 65 different cycle times, these being entirely independent of the spindle speeds.

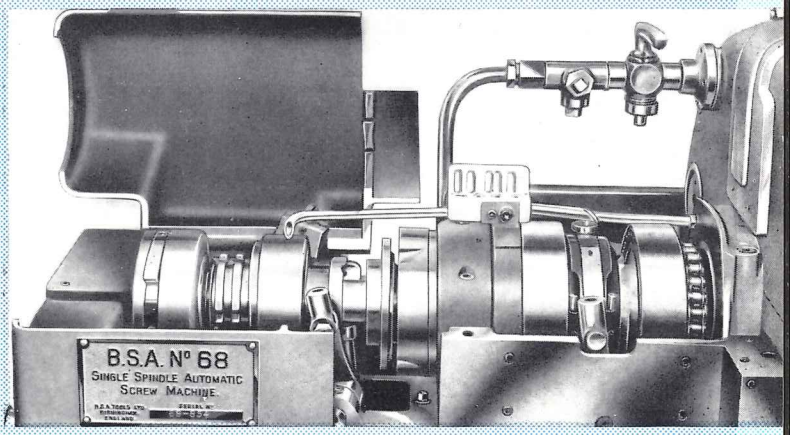


Fig. 4. Headstock with cover removed to show construction of spindle and bearings.

The design is such that change-overs are simple and rapidly made.

SPINDLE SPEEDS

A wide range of spindle speeds is available by means of Pick-Off Gears in the gearbox, which is driven direct from the main drive. Two alternative automatic speed reductions for threading of 1 : 2 or 1 : 5 can be obtained on the standard machine. When using fast and reverse speeds only, a larger choice of ratios is available as shown on the speed plate. All shafts in the gearbox are carried on ball bearings and provided with automatic lubrication.

AUTOMATIC SPEED CHANGES

By means of clutches on the spindle, operated from the camshaft, one automatic speed forward and one reverse or alternatively two speeds in one direction, are obtainable.

The clutches impart a quick and certain movement and are easily accessible for adjustment.

BACKSHAFT

This is driven at a constant speed by belt from the main drive. It can be engaged and disengaged through a lever-operated clutch. A hand wheel is provided for rotating the shaft by hand when setting up.

The dog clutches controlling the movement of the work spindle clutches, stock feeding, collet opening and closing cams and indexing mechanism, are all mounted on the backshaft, and are operated by adjustable trips on the camshaft at the front of the machine.

The stock feed clutch is provided with a half " ¸rev ' and stop feature which allows components which cannot be fed through the spindle to be magazine loaded into the chuck.

DRIVE

The machine is arranged for self-contained motor drive. The motor, mounted in the base of the machine, drives the main gearbox shaft through vee-belts. The advantage of this type of drive is that the machine forms a self-contained unit that can be lifted and moved to another site if desired.

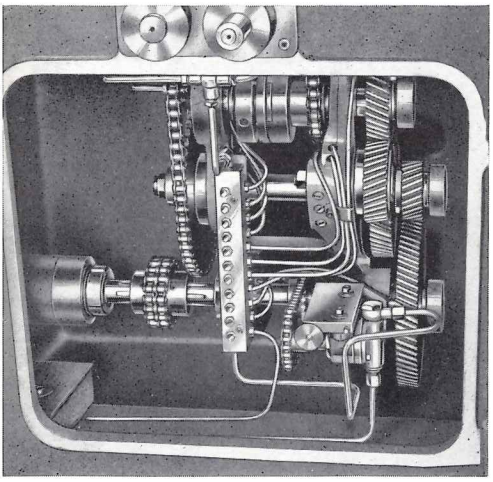


Fig. 5. View of gearbox, showing chain drive to spindle and the pick-off gears for varying the spindle speeds.

COOLANT PUMP AND FITTINGS

These are included, and ensure an ample supply of filtered coolant at a constant pressure.

The nozzle of the delivery pipe is arranged to swivel so that the flow of coolant may be directed to the desired spot ; it is then clamped in position.

CABINET BASE

The base of the machine is well proportioned and specially arranged to ensure ample room for the escape of chips and their subsequent removal. A compartment is provided for accommodating all change gears.

SAFETY FEATURES

The operator is protected against splash and flying chips by effective guards fitted with windows. The guards are arranged to swing clear, giving easy access to the cross slides. All moving parts of the machine are adequately guarded and ample provision is made to safeguard the machine against overload. A slipping clutch in the cycle time gear train ensures that all movements of the machine, except the spindle, stop instantly in the event of undue strain, which may be caused by overload or interference from tools or swarf.

Incorporated in the bar feed mechanism is a device for stopping all movements of the machine with the exception of the work spindle when insufficient bar stock remains to complete another component. This feature is of considerable importance and prevents damage to tools which could result from a short piece of bar stock being fed into the collet.

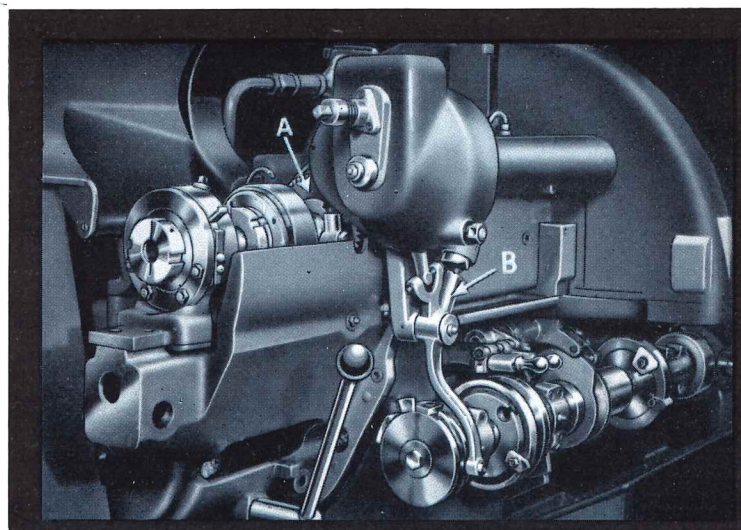


Fig. 8. Driving unit for thread cutting attachment.

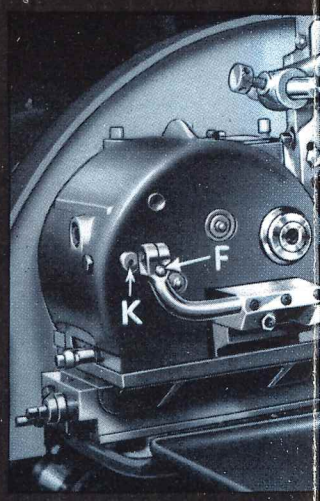


Fig. 9. Showing comp cutting attachr

WORKCHUTE

This is operated from an adjustable dog on the camshaft, and effectively separates swarf from work.

LUBRICATION

All headstock bearings and cross slides have autc-matic lubrication from a C.A.V. pressure plunger pump which draws oil from the tank mounted in the top of the base. Chains and gearbox are lubricated from another pump, fed from the sump in the gearbox compartment of the base ; all other bearings are lubricated by a centralised system operated from a built in hand pump.

THREAD CUTTING ATTACHMENT

This enables the cutting of threads of diameter up to the maximum capacity of the machine and up to $1\frac{1}{4}''$ long; single- and multi-start threads are produced equally well.

Accurate concentric threads may be cut behind a shoulder, thus eliminating the necessity for a second operation. Thread cutting may also be performed simultaneously with another operation from the turret. Greater accuracy is obtainable due to the number of light cuts being taken to form the thread.

The attachment comprises two main units, the driving unit and the thread cutting unit.

The driving unit driven from gear " A," figure 8, on rear end of spindle is stopped and started by clutch lever " B " operated from front cam shaft. The unit may be quickly and easily detached when not required; all revolving parts are completely enclosed.

The thread cutting tool " C," figure 11, is attached to a transverse slide which derives its motion from lead screw " D " and leader nut " E," figure 10. This transverse slide is mounted on a longitudinal slide so that the cutting tool may be withdrawn from the work after completing the necessary turns from the lead screw.

In operation the only setting required is the adjustment of screw " F," figure 9, which determines when leader nut withdraws from lead screw and another cut commences.

The operations of withdrawing leader nut, returning cutting tool to its starting point and advancing leader nut on lead screw are entirely automatic. These operations are controlled by a double cam which derives its movements from gear " G," figure 10, which is driven intermittently by clutch " H."

The lead screw " D " is driven continuously by gear " J," figure 10, which in turn is driven from the main drive unit. When adjustment screw " F " comes into contact with plunger " K," figure 9, this raises the trip lever " L," releases spring loaded clutch " H," and so engages with the clutch teeth on the continuously revolving gear " J." This in turn drives the double cam. Before the completion of one revolution of the double cam the trip lever " L " returns to its normal position, disengaging clutch " H." It remains in this position until the end of the next cutting stroke.

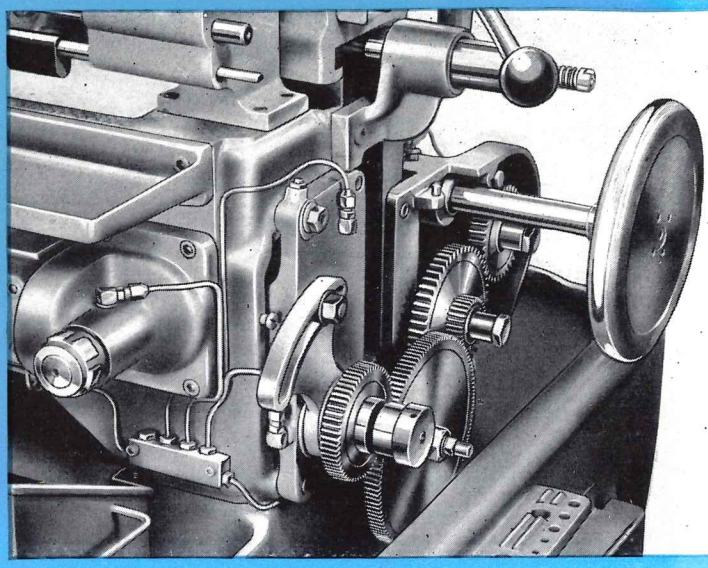
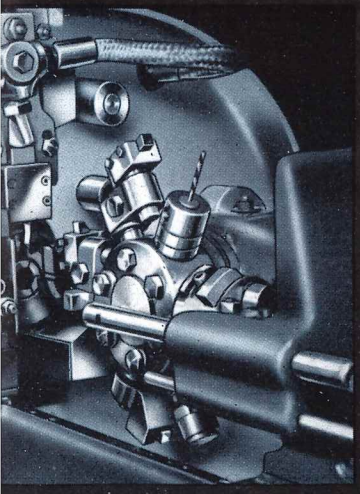


Fig. 7. Cover removed giving easy access to cycle time gear.



act arrangement of thread
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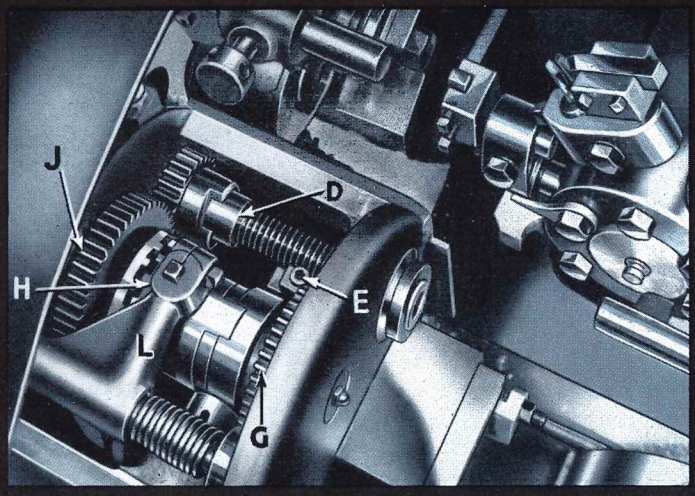


Fig. 10. Cover removed from thread cutting attachment.

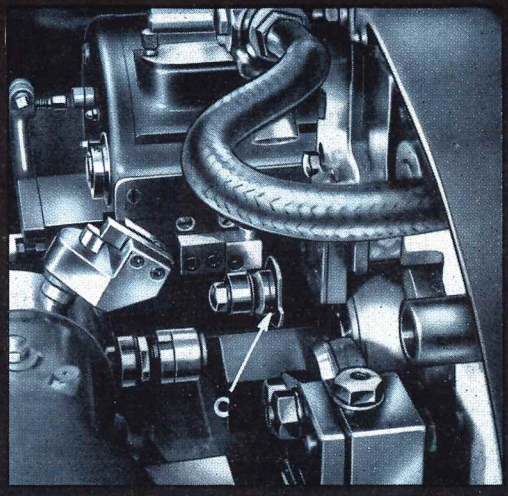


Fig. 11. Showing thread cutting tool.

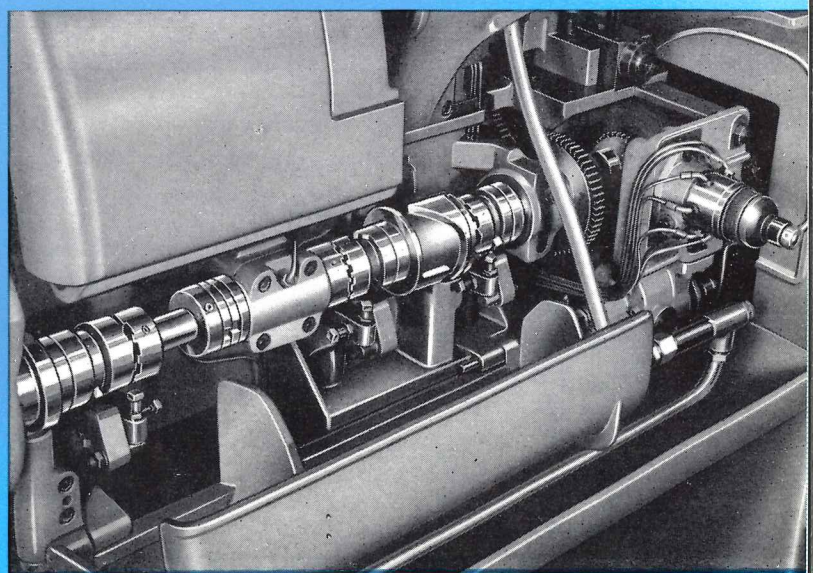


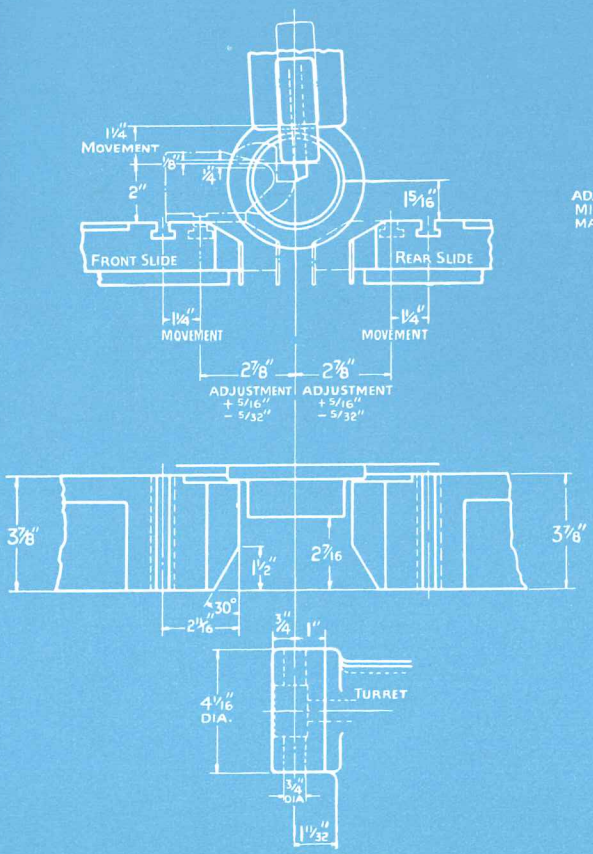
Fig. 6. Cover lowered giving easy access to backshaft. Efficient bearings and rigid construction ensure lasting service under the most strenuous conditions.

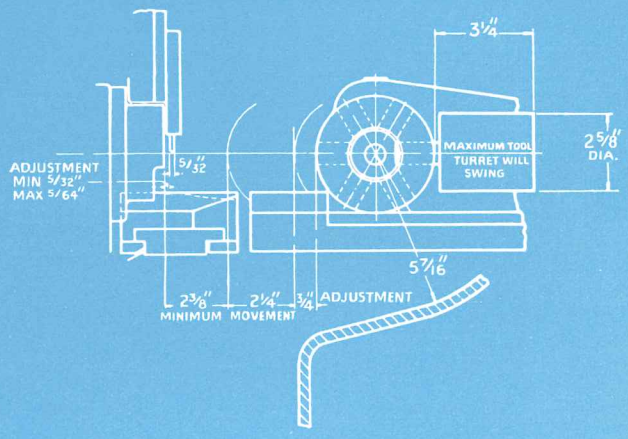
SPECIFICATION

Largest stock taken by $\frac{5}{8}$″ Machine Collet and extra Feed Tube	Round ..	$\frac{5}{8}$″ (15.87 mm.)
	Square ..	$\frac{7}{16}$″ (11.11 mm.)
	Hexagon. A/F	.525″ (13.33 mm.)
No. 68 Feed Finger and Collet	Round ..	over $\frac{5}{8}$″ to $\frac{3}{4}$″ (15.87 to 19.05 mm.)
	Square ..	over $\frac{7}{16}$″ to $\frac{1}{2}$″ (11.11 to 12.7 mm.)
	Hexagon. A/F	over .525″ to $\frac{5}{8}$″ (13.33 to 15.87 mm.)
Diameter of hole, through standard feed tube		.773″ (19,63 mm.)
Maximum length dealt with at one movement	turned	2″ (50.8 mm.)
	fed	3″ (76.2 mm.)
Maximum diameter threaded using diehead		$\frac{5}{8}$″ find thd.
Number of spindle speeds		40
Range of spindle speeds, r.p.m.		53—4480
Number of cycle times		65
Cycle time range	Fastest	2
	Slowest	180
Actual time allowed to feed stock—seconds		1/2
Actual time allowed for automatically changing speed—seconds		1/4
Actual time allowed to index turret		1/2
Diameter of turret		$4\frac{1}{16}$″ (103.18 mm.)
Number of holes in turret		6
Diameter of holes in turret		$\frac{3}{4}$″ (19.05 mm.)
Maximum distance tools can project from turret		$3\frac{1}{4}$″ (82.55 mm.)
Maximum diameter tool turret will swing		$2\frac{5}{8}$″ (66.67 mm.)
Maximum distance chuck to turret		$5\frac{3}{8}$″ (136.67 mm.)
Minimum distance chuck to turret		$2\frac{3}{8}$″ (60.32 mm.)
Adjustment of Turret Slide		$\frac{3}{4}$″ (19.05 mm.)
Centre of spindle to top of cross slides		$1\frac{5}{16}$″ (33.33 mm.)
Movement of Cross Slide		$1\frac{1}{4}$″ (31.75 mm.)
H.P. of Motor required		4
Speed of Motor, r.p.m.		1,430
Floor space occupied		175″ × 32″ (4445 × 812 mm.)
Approx. net weight		2800 lbs. (1272.7 kg.)
Approx. gross weight		3360 lbs. (1527.2 kg.)
Approx. shipping dimensions		109 cubic ft. (3.1 cu. mts.)

B·S·A

NO 68 single spindle AUTOMATIC SCREW MACHINE





CAPACITY CHART

PRICE CODES

B.S.A. No. 68 Single-Spindle Automatic Screw Machine, arranged for self-contained vee-belt motor drive, including vee-belt and pulleys, but exclusive of Electrical Equipment. Standard Equipment included with machine comprises :—

Third Slide.
One Collet and Feed Finger. $\frac{3}{4}$" dia.
*One Collet Sleeve for $\frac{5}{8}$" B.S.A. Collets.
*One Extra Feed Tube for B.S.A. $\frac{5}{8}$" and B & S No. 11A, Machine Feed Fingers.
Turret Double Indexing Parts.
Two Cross Slide Cam Blanks.
One Silent Bar Tube.
One set of 14 Pick-off Gears for work spindle speed.
One set of 20 Pick-off Gears for cycle time.
Bar Tube Support Stand.
One Lead Cam Blank.
Pump and Fittings.
Splash Guards.
Tool Kit.

MACHINE AS ABOVE	Codeword
STANDARD LONG STROKE	68LSA
SHORT STROKE (to order)	68SSA
DRIVE UNIT 4 H.P. Totally enclosed Fan Cooled Foot mounted Squirrel Cage Motor, Frame Size KNB225. 1,430 r.p.m. 200/380/420 Volts, 3 phase, 50 cycle, A.C. supply	68SSM
STARTER Special Vertical Control Panel, with three Overloads, Isolator, Main and Attachment HRC Fuses, "Start" and "Stop" push button station. Rotary reversing switch	68SSS

* This additional chuck closing sleeve and feed tube adaptor enables the B.S.A. No. 68 machine to accommodate collets and feed fingers used on B.S.A. $\frac{5}{8}$" machine and also interchange with B & S Collet No. 11 and feed finger 11A. The chuck closing sleeve and feed tube supplied with the No. 68 machine also accommodates B & S No. 110 collets and No. 21A feed fingers.

EXTRAS

ATTACHMENTS

	Drawing No. and Codeword
High speed Backshaft and short stroke Turret Parts after machine is delivered (Fitting extra)	5/8826
Tool Holder (additional) $\frac{1}{4}$" blade, for Third Slide	SE34/30
Screw Slotting Attachment	68–12AR
Nut Tapping Attachment (Revolving Spindle)	5/848AR
Burring or Rear End Drilling Attachment	68–10AR
Revolving Drilling Attachment	5/881A
Revolving Drill Holder, additional	5/888A
Drill Collets for Code 5/888A	5/83496
Swing Stock Stop	68–101AR
Internal Coolant Supply for Turret Tools	5/883A
Thread Cutting Attachment, R.H., including one lead screw and nut	68–168AR
Additional Parts for L.H. External Threading	5/886AR
Additional Lead Screw and Nut	5/83197/8
Double Movement Front Cross Slide	5/869A
Longitudinal Turning Attachment L.H., Turret Operated	5/8–85AR
Longitudinal Turning Attachment, L.H.	5/884A
Longitudinal Turning Slide, L.H., Turret Operated	SE348
*Spindle Brake Attachment { Single Speed	5/891AR
*Spindle Brake Attachment { Two Speed	5/889AR
Turret Saw Slotting Attachment	5/890AR
Cross Drilling Attachment	5/8–92AR

TURRET TOOLS

Adjustable Holder	ZG58–3029E
Adjustable Holder and Turner	ZG58–3699
Radial Knee Tool (Solid type R.H.)	ZG58–4242
Radial Knee Tool (Solid type L.H.)	ZG58–4161
Tangential Knee Tool (Solid type R.H.)	ZG58–4037
Tangential Knee Tool (Solid type L.H.)	ZG58–4038
Knee Tool (Adjustable)	ZG58–3705E
Tangential Turning Stem, R.H.	ZG58–4172–1
Tangential Turning Stem, L.H.	ZG58–4172–2
Roller Box Tool (Single Tool, R.H.)	ZG58–3961E
Roller Box Tool (Single Tool, L.H.)	ZG59–3960E
Roller Carrier Capacity { .156" to .218"	ZG58–4370
Roller Carrier Capacity { .375" to .500"	ZG58–4371
Roller Box Tool for Two Tools, R.H.	ZG58–3696
Roller Box Tool for Two Tools, L.H.	ZG58–3697
Box Tool (Vee Steady, R.H.)	ZG58–3024E
Box Tool (Vee Steady, L.H.)	ZG58–3010E
Centring and Facing Tool	ZG58–3702
Drill R.H., for Code ZG58–3702	ZG58–3702/2
Drill L.H., for Code ZG58–3702	ZG58–3702/4
Centring and Facing Tool with Vee Steady, R.H.	ZG58–3962
Centring and Facing Tool with Vee Steady, L.H.	ZG58–3963
Adjustable Boring Tool Holder	ZG58–4106

*Can only be fitted to machine prior to delivery. When ordering please state sequence of positions, i.e. fast, slow, stop, slow ; slow, stop, fast, slow.

B·S·A NO 68
single spindle AUTOMATIC SCREW MACHINE

TURRET TOOLS *(cont.)*

	Drawing No. and Codeword
Drill Holder (Plain)	ZG58–3028E
Tap Holder (non-releasing)	ZG58–3027
Tap Holder (releasing)	ZG58–3999
Button Die Holder (non-releasing)	ZG58–4177
Button Die Holder (releasing)	ZG58–4236
Die Cap Extra Capacity, $1\frac{1}{2}''$ dia. $\times \frac{1}{2}''$	ZG58–4177/12/13 & 14
Stock Stop	ZG58–3017
Adjustable Stock Stop	ZG58–3646
Adjustable Revolving Stock Stop	ZG58–3959
Floating Reamer Holder	ZG58–4059
Recessing Swing Tool (Front Slide operated)	ZG58–3035
External Swing Tool, R.H. (Front Slide operated)	ZG58–3036
External Swing Tool, L.H. (Front Slide operated)	ZG58–4042
Back Rest for Swing Tools	ZG58–4058
Back Rest for Turret	ZG58–2991
Adjustable Knurl Holder	ZG58–3049
Recessing Tool	ZG58–4519

CROSS SLIDE TOOLS

Tool Post for Circular Tools	ZG58–1326—Front
Tool Post for Circular Tools	ZG58–1327—Rear
Tool Post for Square Tools (Front Slide)	ZG58–3965 L.H.
Tool Post for Square Tools (Front Slide)	ZG58–3964 R.H.
Tool Post for Square Tools (Rear Slide)	ZG58–3967 L.H.
Tool Post for Square Tools (Rear Slide)	ZG58–3966 R.H.
Tool Holder for Two Tools	ZG58–4173 R.H.—Front
Tool Holder for Two Tools	ZG58–4175 R.H.—Rear
Tool Holder for Two Tools	ZG58–4174 L.H.—Front
Tool Holder for Two Tools	ZG58–4176 L.H.—Rear
Blade Cut-off Tool Posts (Rear Slide, R.H.)	ZG58–3772
Blade Cut-off Tool Posts (Rear Slide, L.H.)	ZG58–3707
Blade Cut-off Tool Posts (Front Slide, R.H.)	ZG58–3708
Fixed Guide Plates, Side Fixing type (Front Cross Slide)	ZG58–3738
Fixed Guide Plates, Raising Block type (Front Cross Slide)	ZG58–3737
Adjustable Guide Plates, Side Fixing type (Front Cross Slide)	ZG58–3736
Adjustable Guide Plates, Raising Block type (Front Cross Slide)	ZG58–3040R
Side Knurl Holder	ZG58–2883
Top Knurl Holder	ZG58–3052

MISCELLANEOUS

Cam Blank (Turret) 7″ dia.	ZG58–3023/2
Cam Blank (Cross Slide) 6″ dia.	ZG58–3023/1
Cam Blank (Third Slide) 6″ dia.	ZG58–2645
Cam Templates	ZG58–4356
Lever Templates	ZG58–3930
Low Ratio Gears (per pair)	—
Screw Slotting Saws :—.032″ thick, 75 teeth	ZG58–3043/32
.040″ thick, 75 teeth	ZG58–3043/40
.062″ thick, 75 teeth	ZG58–3043/62
.084″ thick, 75 teeth	ZG58–3043/84
Speed Gears (additional) per pair	—
Cut-off Blade, Third Slide	ZG58–4147
Straight Knurls, $\frac{5}{8}''$ o/dia. $\times \frac{1}{4}''$ thick $\times \frac{1}{4}''$ hole :—47 teeth	ZG3047–7
41 teeth	ZG3047–8
35 teeth	ZG3047–9
29 teeth	ZG3047–10
24 teeth	ZG3047–11
19 teeth	ZG3037–12
Standard Blank Bushings, $\frac{5}{8}''$ o/dia. $\frac{7}{8}''$ length	ZG58–4356
Cut-off Blades, 5″ length, $\frac{3}{32}''$ thick, $\frac{11}{16}''$ wide	ZG58–3772–6
Chain Riveting Tool	M72
Chain Rivet Extracting Tool	311006

The policy of B.S.A. Tools Ltd. is one of continuous improvement. The right is reserved to alter the design or any constructional details of their manufactures at any time without giving notice.

Manufacturers

BSA TOOLS LTD
BIRMINGHAM ENGLAND
AGENTS THROUGHOUT THE WORLD

Distributors :

THE NATIONAL ACME COMPANY,
CLEVELAND 8, OHIO.

Designed and Printed by Weather Oak Press Ltd., Edgbaston, Birmingham 15